

**UNCLASSIFIED**

**AD 4 2 3 9 2 0**

**DEFENSE DOCUMENTATION CENTER**

**FOR**

**SCIENTIFIC AND TECHNICAL INFORMATION**

**CAMERON STATION, ALEXANDRIA, VIRGINIA**



**UNCLASSIFIED**

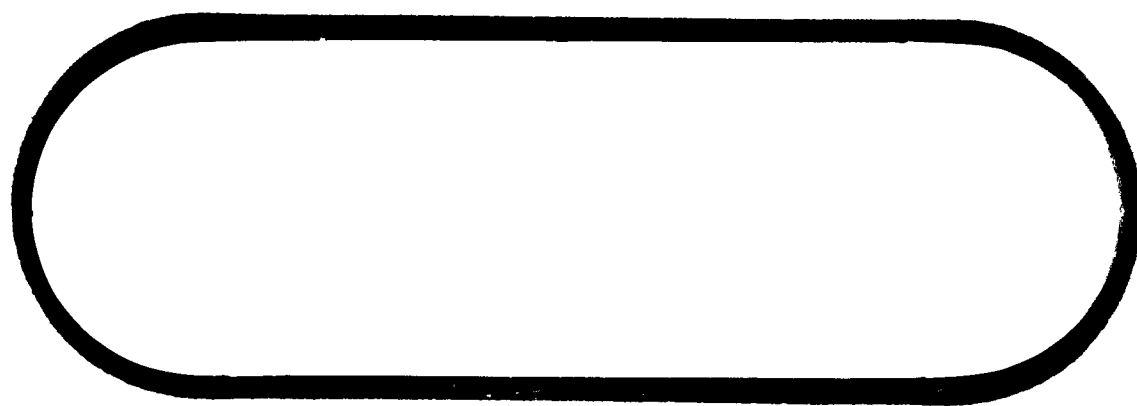
NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

⑤ 127300

10

AD No. \_\_\_\_\_  
DDC FILE COPY 423920

**BOEING**



DDC  
NOV 27 1963  
TBA B

**SEATTLE, WASHINGTON**

\$2.60

CODE IDENT NO. 81205

NUMBER D2-6564-2, dated 15 March 1963

**TITLE** QUALIFICATION TEST REPORT FOR MODEL SPECIFICATION S-133-112-1-1, AND QUALIFICATION SUPPLEMENT I THEREOF, CABLE ASSEMBLIES, INTRASITE, LAUNCH CONTROL FACILITY

MODEL NO. WS-133A CONTRACT NO. AF 04(647)-289

ISSUE NO. \_\_\_\_\_ ISSUED TO \_\_\_\_\_

5-78105-5640-68768  
Charge Number

**SPECIAL LIMITATIONS ON ASTIA DISTRIBUTION**

ASTIA may distribute this report to requesting agencies subject to their security agreement, approved fields of interest, and the following

☒ **UNLIMITED**—To all agencies of the Department of Defense and their contractors

☐ **LIMITED**—To U. S. Military organizations only

This report may be distributed to nonmilitary agencies not approved above subject to Boeing approval of each request.

**NOTE** the LIMITED category may be checked only because of actual or potential patent, proprietary, ethical, or similar implications.

<b>CABLE DESIGN</b>	<u>R. B. Edgar</u>	<u>3-11-63</u>
<b>STRUCTURES TECHNOLOGY</b>	<u>F. H. Robinson</u>	<u>3-14-63</u>
<b>PREPARED BY</b>	<u>R. P. Carlson</u>	<u>3-15-63</u>
<b>SUPERVISED BY</b>	<u>R. T. Colyer</u>	<u>3-18-63</u>
<b>APPROVED BY</b>	<u>R. B. Edgar</u>	<u>3-18-63</u>
<b>APPROVED BY</b>	<u>Noble Bryan</u>	<u>3-18-63</u>
<b>CLASS &amp; DISTR APPROVED BY</b>	<u>R. B. Edgar</u>	<u>(DATE)</u>
<b>SPECIFICATION CONTROL APPROVAL</b>	<u>W. E. Woods</u>	<u>3-17-63</u>

REV SYM \_\_\_\_\_

SECTION	ORIG REL PAGE NO.	REV SYM	ADDED PAGES					SECTION	ORIG REL PAGE NO.	REV SYM	ADDED PAGES					SECTION	ORIG REL PAGE NO.	REV SYM
			PAGE NO.	REV SYM	PAGE NO.	REV SYM	PAGE NO.				PAGE NO.	REV SYM	PAGE NO.	REV SYM	PAGE NO.			
	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
	7																	
	8																	
	9																	
	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
	22																	
	23																	
	24																	
	25																	
	26																	
	27																	
	28																	
	29																	
	30																	
	31																	
	32																	
	33																	
	34																	
	35																	
	36																	
	37																	
	38																	
	39																	
	40																	
	41																	
	42																	
	43																	
	44																	
	45																	
	46																	
	47																	
	48																	
	49																	
	50																	
	51																	
	52																	
	53																	
	54																	
	55																	
	56																	
	57																	
	58																	
	59																	
	60																	
	61																	
	62																	
	63																	
	64																	
	65																	
	66																	
	67																	
	68																	
	69																	
	70																	
	71																	
	72																	
	73																	
	74																	
	75																	
	76																	
	77																	
	78																	
	79																	
	80																	
	81																	
	82																	
	83																	
	84																	
	85																	
	86																	
	87																	
	88																	
	89																	
	90																	
	91																	
	92																	
	93																	
	94																	
	95																	
	96																	
	97																	
	98																	
	99																	
	100																	

1-4 4801 1-4 4801 1-4 4801

REV SYM \_\_\_\_\_

BOEING

D2-6564-2



## TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
	TITLE PAGE	1
	CHANGE RECORD	2
	REVISION PAGE	3
	TABLE OF CONTENTS	4
1.0	SCOPE	5
2.0	GENERAL INFORMATION	5
3.0	CERTIFICATION OF QUALIFICATION	7
4.0	QUALIFICATION TEST RESULTS	8
5.0	REDUCED DATA	13
6.0	CONCLUSIONS AND RECOMMENDATIONS	28
7.0	NOTES	28

**QUALIFICATION TEST REPORT  
FOR MODEL SPECIFICATION S-133-112-1-1  
QUALIFICATION SUPPLEMENT I THEREOF  
CABLE ASSEMBLIES, INTRASITE, LAUNCH CONTROL FACILITY**

1. **SCOPE** - This qualification report, which is associated with the respective basic specification (S-133-112-1-1, D2-6564) and qualification supplement (D2-6564-1), covers the qualification testing of the Cable Assemblies, Intrasite, LCF, hereinafter termed "Cable Assemblies". Also covered is the certification of compliance with the qualification supplement.

2. **GENERAL INFORMATION**

2.1 **References** - The following non-Government documents form the complete basis of this Qualification Test Report:

The Boeing Company

D2-6564	8 November 1961	Model Specification, Cable Assemblies, Intrasite, LCF (S-133-112-1-1)
D2-6564-1	16 July 1962 (AF Approval Pending 16 July 1962)	Supplement I to Model Specification S-133-112-1-1, Qualification Requirements and Testing, Cable Assemblies, Intrasite, LCF
D2-10135	21 December 1962	Detail Qualification Test Procedure for the Cable Assemblies, Intrasite, LCF (S-133-112-1-1) and LF (S-133-111-1-5)
T2-2982-1 and -2	13 February 1963	Qualification Data Package, Cable Assemblies, Intrasite, Figure "A" 1246

(Application for copies should be addressed to The Boeing Company, Aero-Space Division, P. O. Box 3985, Seattle 24, Washington)



2.2 Qualification Requirements - The qualification requirements for the Cable Assemblies are stated in Qualification Requirements and Test Methods, Supplement I to the Model Specification. Correlation is provided between these qualification requirements and the qualification test results contained in Section 4 herein, by means of cross reference (to the respective qualification supplement requirement and test method) in each summary report of a test.

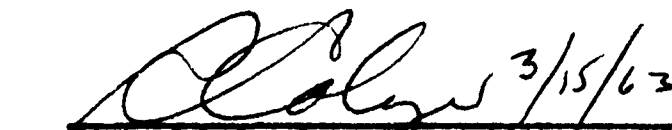
A certification of full compliance with the qualification supplement is provided on the following page.

2.3 Nature of Qualification Test Report - This Qualification Report is in summary form for each requirement and test. Typical or summary data are included for each test, with references to the subsidiary data package T2-2982-1 and -2. These subsidiary data packages are on file in The Boeing Company Engineering Files, and may be obtained by application per 2.1.


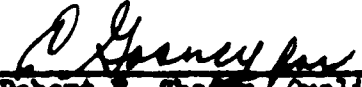


### 3. CERTIFICATION OF QUALIFICATION

I hereby certify that the Cable Assemblies, Intrasite, Launch Control Facility, Boeing Drawing Number 21-51663-2, part of Figure "A" Number 1246, have been tested as reported herein, and in my opinion, have evidenced full compliance with Supplement I, Qualification Requirements and Testing, dated 16 July 1962 (A. F. Tech. Approval Pending 16 July 1962) of Model Specification S-133-112-1-1, dated 8 November 1961. Qualification of the above drawing number is also applicable by similarity to Drawing Numbers 21-51669-5, -6, and -7.

  
R. T. Celyer, Group Supervisor  
Environmental Design Assurance Group  
Equipment Integration Unit  
Electronic Design Project, Minuteman Branch  
Aero-Space Division  
The Boeing Company

I hereby certify that the data (T2-2982-1 and -2) for this test program was obtained under Quality Control surveillance as evidenced by the quality control stamps which appear on the data sheets.

   
Robert E. Shaffer, Quality Control Supervisor  
Electronics System Test and  
Electronic Development Support  
Aero-Space Division  
The Boeing Company  
Seattle, Washington

#### 4. QUALIFICATION TEST RESULTS

##### 4.1 Examination of Product

4.1.1 Design and Construction - The Cable Assemblies were examined for conformance to drawing requirements applicable to part numbers specified in the requirement of 3.2 and 4. of the qualification supplement and found to be in accordance with Drawing Number 21-51663-2 (Reference Section 2.0 through 9.0 of T2-2982-1 and T2-2982-2).

4.1.2 Human Engineering - Cable Assemblies of identical or similar configurations (Drawing Number 21-51666-1, Serial Numbers 0000004) were examined for Human Engineering during First Article Configuration Inspection as specified in requirement 3.5 of the qualification supplement. The Cable Assemblies were found to be in full compliance with the requirement (Reference Section 12.0 of T2-2982-2).

4.1.3 Identification and Marking - Cable Assemblies of identical or similar configurations (Drawing Number 21-51666-1, Serial Numbers 0000004) were examined during First Article Configuration Inspection for Identification and Marking as specified in the requirement 3.6 of the qualification supplement. The Cable Assemblies were found to be in full compliance with the requirement (Reference Section 12.0 of T2-2982-2).

4.1.4 Workmanship - Cable Assemblies of identical or similar configuration (Drawing Number 21-51666-1, Serial Number 0000004) was examined during First Article Inspection for Workmanship as specified in the requirement 3.7 of the qualification supplement. The Cable Assemblies were found to be in full compliance with the requirements (Reference Section 12.0 of T2-2982-2).

4.2 Performance Tests - The Cable Assemblies were functionally tested in accordance with 4.0 of the Detail Qualification Test Procedure, D2-10135. The Cable Assemblies performed in full compliance with the requirement of 3.3, 3.3.1, and 4.0 of the qualification supplement (Reference Section 2, T2-2982-1).

##### 4.3 Environments

4.3.1 Temperature-Altitude (Non-Operating) - The Cable Assemblies were subjected to the temperature-altitude test (See Photograph 1) of 5.2 of D2-10135 (Figure 1 herein). The Cable Assemblies performed in full compliance with the requirements of 3.4 and 4. of the qualification supplement (Reference 5.1 herein).

4.3.2 Humidity (Non-Operating) - The Cable Assemblies were subjected to the humidity test of 5.3 of D2-10135 (Figures 2 through 7 herein). The Cable Assemblies performed in full compliance with the requirements of 3.4 and 4. of the qualification supplement as modified by 7.3 herein. (Reference 5.2 herein).

4.3.3 Shock (Non-Operating) - The Cable Assemblies were subjected to the machine shocks (See Photographs 2 and 3) of 5.4 of D2-10135 (Figures 8 through 11 herein) and performed in full compliance with the requirements of 3.4 and 4. of the qualification supplement (Reference 5.3 herein).

4.3.4 Vibration (Operating) - The Cable Assemblies were subjected to the vibration test of 5.5 of D2-10135 (Figures 12 and 13 herein) and performed in full compliance with 3.4 and 4. of the qualification supplement, except as noted in 7.4 herein. (Reference 5.4 herein).

4.3.5 Temperature-Altitude (Operating) - The Cable Assemblies were subjected to the temperature-altitude test of 5.2.2 of D2-10135 (Figure 14 herein). The Cable Assemblies performed in full compliance with the requirements of 3.4 and 4.2 of the qualification supplement (Reference 5.5 herein).





ENGINE ASSEMBLY

TEMPERATURE-ALTITUDE (NOM-CP)

PROFUNDITY 1

40-497 1-1 000

**BOEING**

NO. D2-6564-2

PAGE 10





REAR (NON-EXHAUSTING)  
TRANSCEIVER DIRECTION

PHOTOGRAPH 2

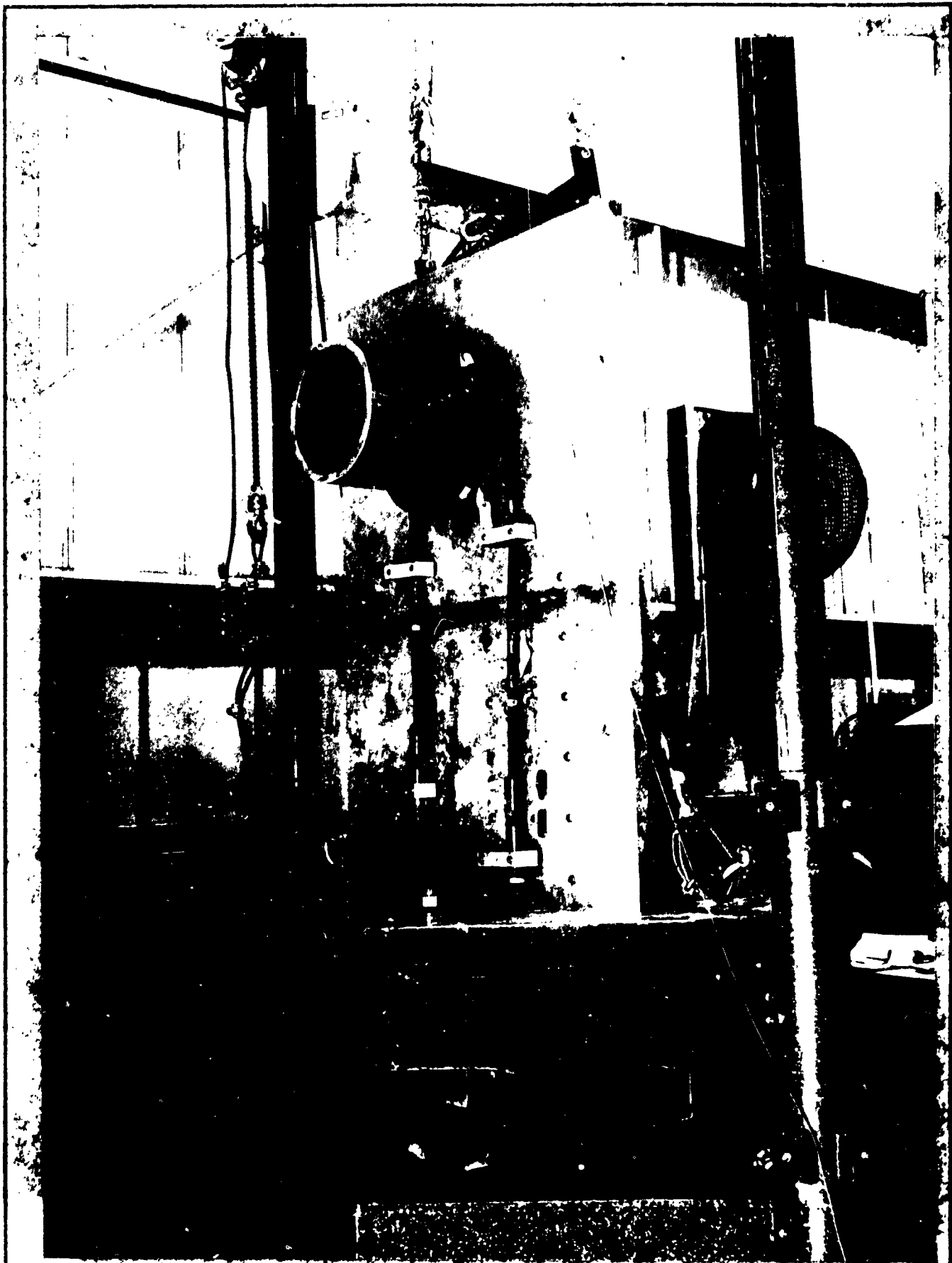
U3-4071-1000

**BOEING**

NO. D2-6564-2

PAGE 11





WIND TUNNEL (NON-OPERATING)  
AXIAL DIRECTION

PHOTOGRAPH 3.

U3-4071-1000

5. REDUCED DATA - Reduced data presented in this section is derived from the test data obtained during the Qualification Test Program. This test data is recorded on Manufacturing and Inspection Records (MIR) and because of its bulk is available under a separate cover (Reference 7.1). A cross reference from the reduced data to the test data from which it was derived is provided for each test reported.

5.1 Temperature-Altitude (Non-Operating) - Reduced data of the non-operating temperature-altitude test appears on Figure 1. This data was derived from Section 6.0 of T2-2982-2.

5.2 Humidity (Non-Operating) - Reduced data of the non-operating humidity test appears on Figures 2 through 7. This data was derived from Section 6.0 of T2-2982-2.

5.3 Shock (Non-Operating) - Reduced data of the non-operating shock test appears on Figures 8 through 11. This data was derived from Section 6.0 of T2-2982-2.

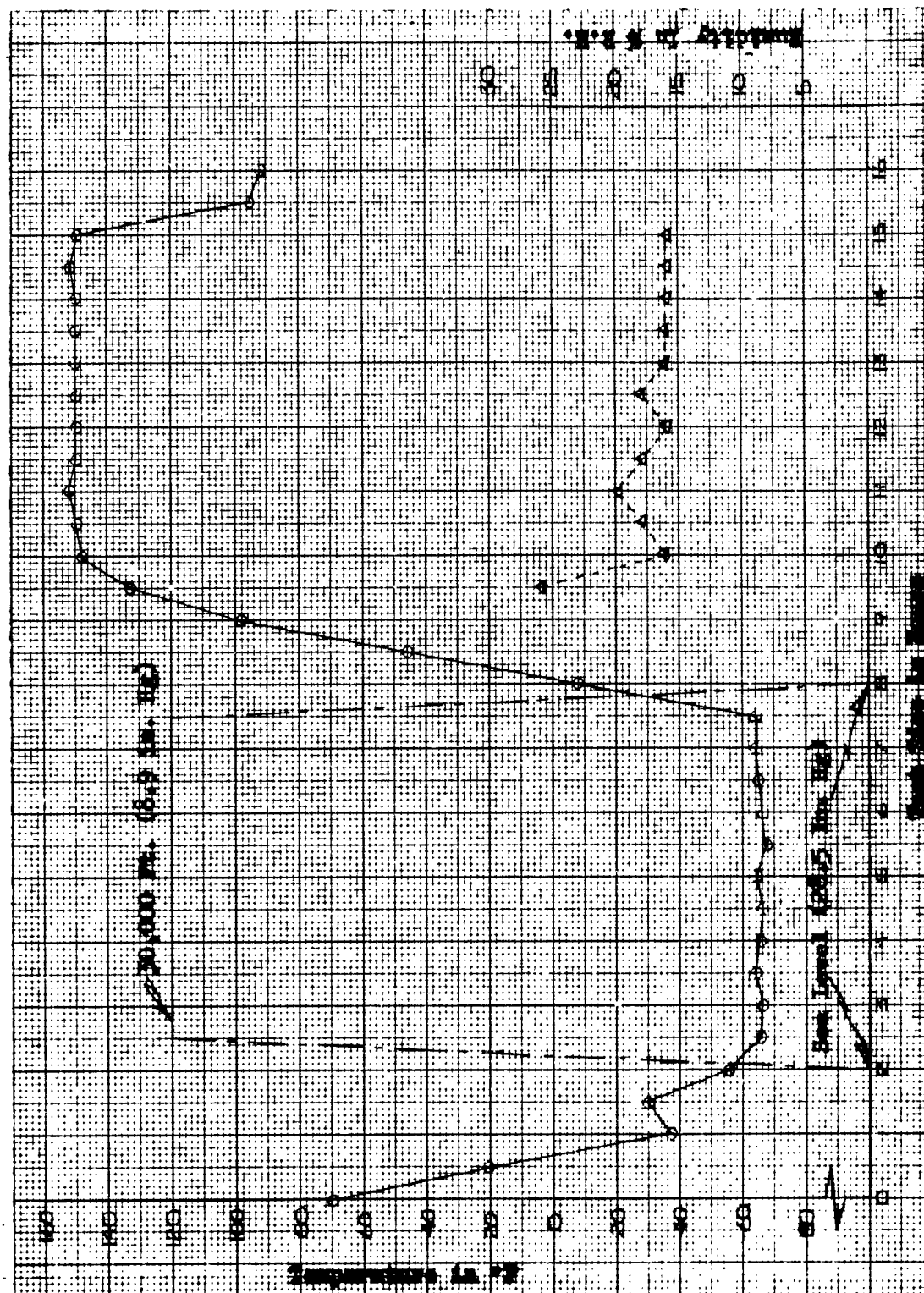
5.4 Vibration (Operating) - This operating vibration data appears on Figures 12 and 13. This data was derived from Section 6.0 of T2-2982-2.

5.5 Temperature-Altitude (Operating) - Reduced data of the operating temperature-altitude test appears on Figure 14. This data was derived from Section 6.0 of T2-2982-2.



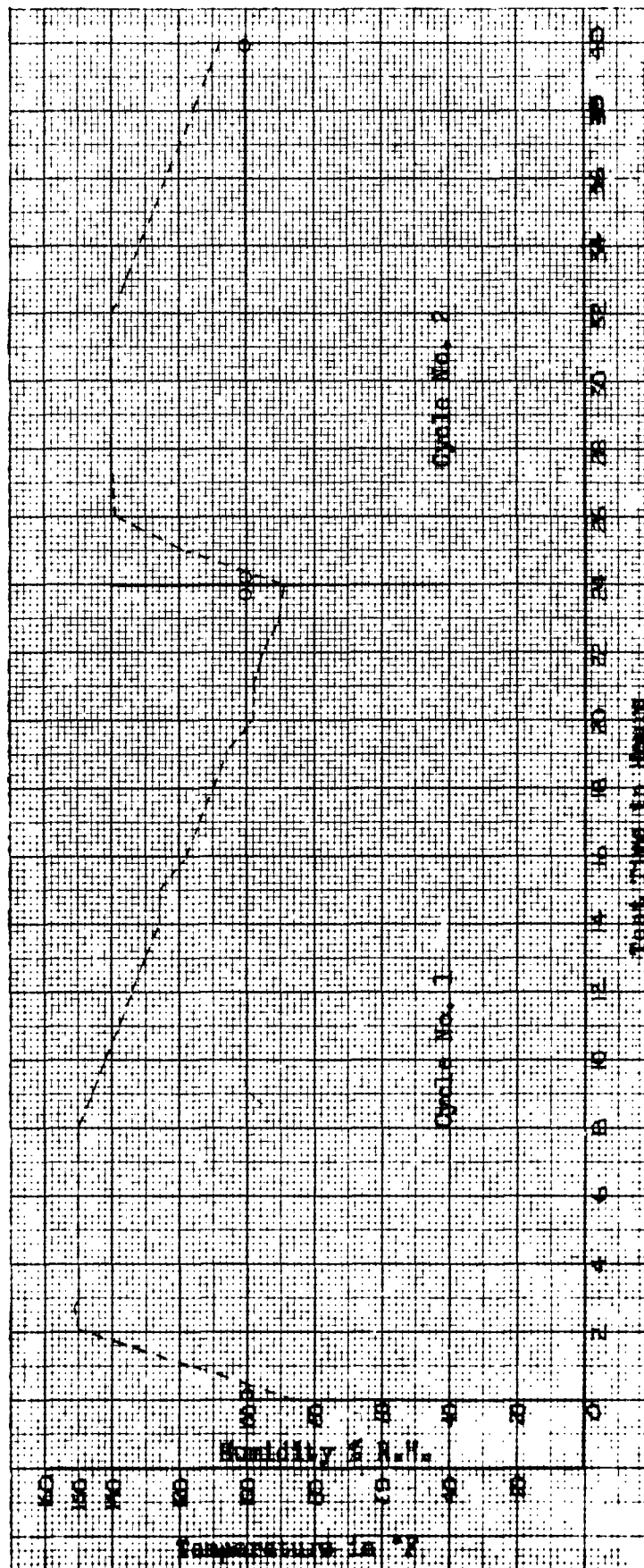
KEY:

○ CHAMBER TEMP.  
 --- CHAMBER PRESSURE  
 ▲ CHAMBER HUMIDITY



21-51000-0602 (Typical Cable Assembly)  
 TEMPERATURE-ALTITUDE (NON-OP)

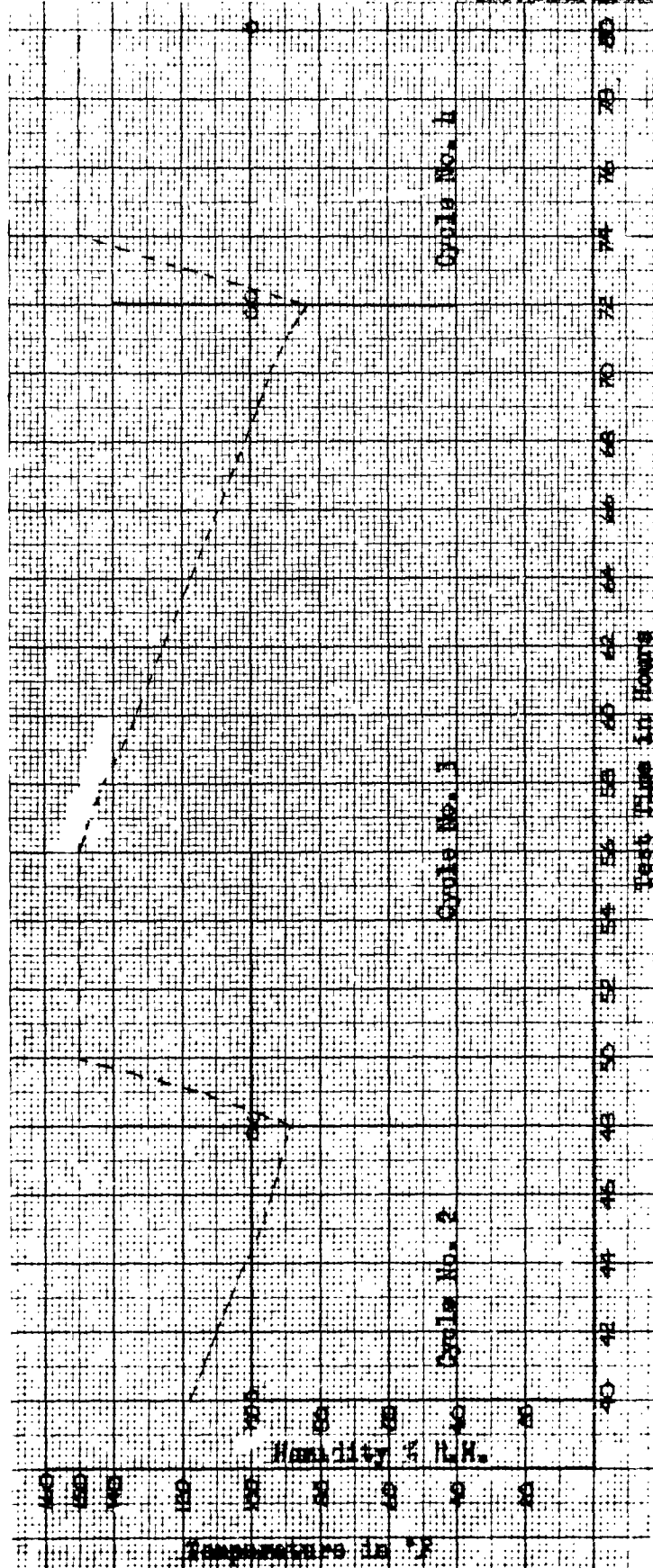
FIGURE 1



KEY: HUMIDITY —○—  
TEMPERATURE - - -

21-11000-0602 (Typical Cable Assembly)  
HUMIDITY (NON-OPERATING)

FIGURE 2

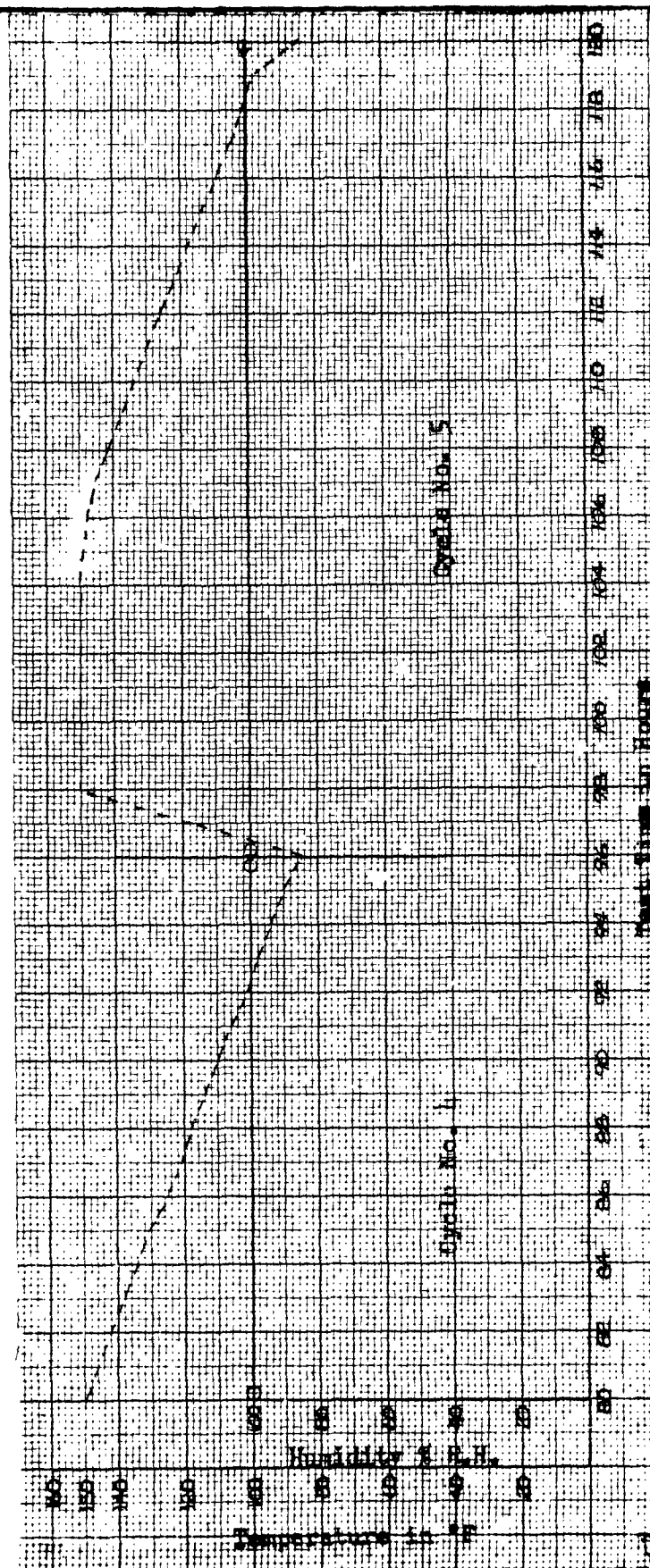


23-5000-0002 (Typical Cable Assembly)  
HUMIDITY (NON-OPERATING)

KEY:  
 HUMIDITY —○—  
 TEMPERATURE - - -

FIGURE 3



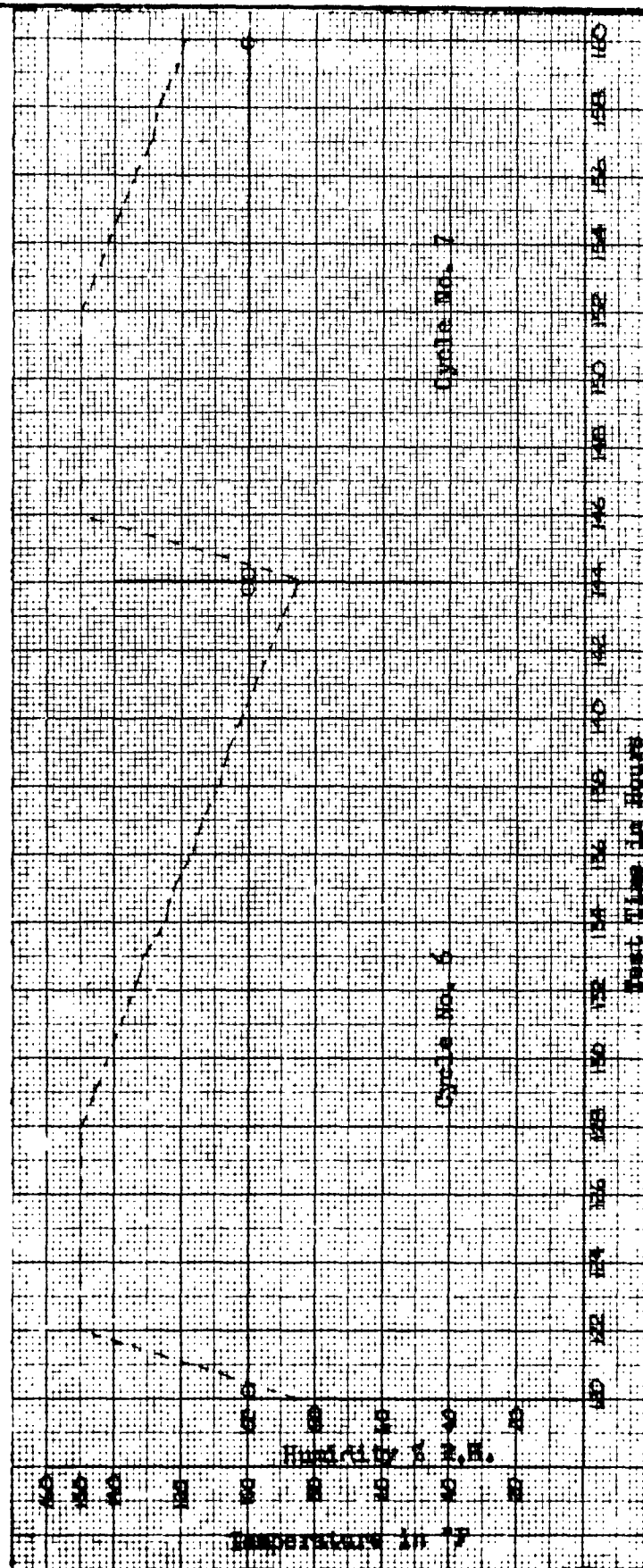


KEY: HUMIDITY —○—  
TEMPERATURE ---

**2-50000002 (Typical Cycle Assembly)**  
**HUMIDITY (NON-OPERATING)**

FIGURE 4



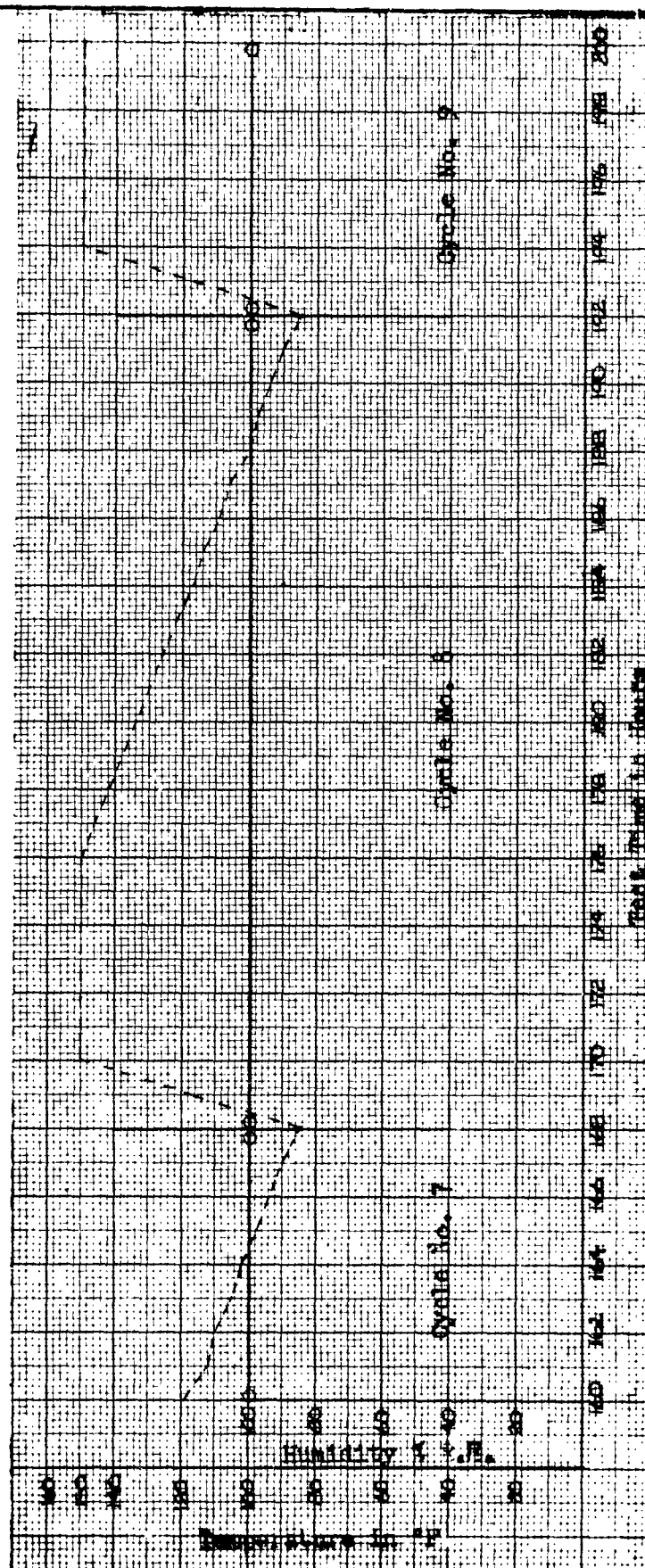


KEY:  
 HUMIDITY ○ —  
 TEMPERATURE - - -

21-2000-0602 (Typical Cable Assembly)  
 HUMIDITY (NON-OPERATING)

FIGURE 5





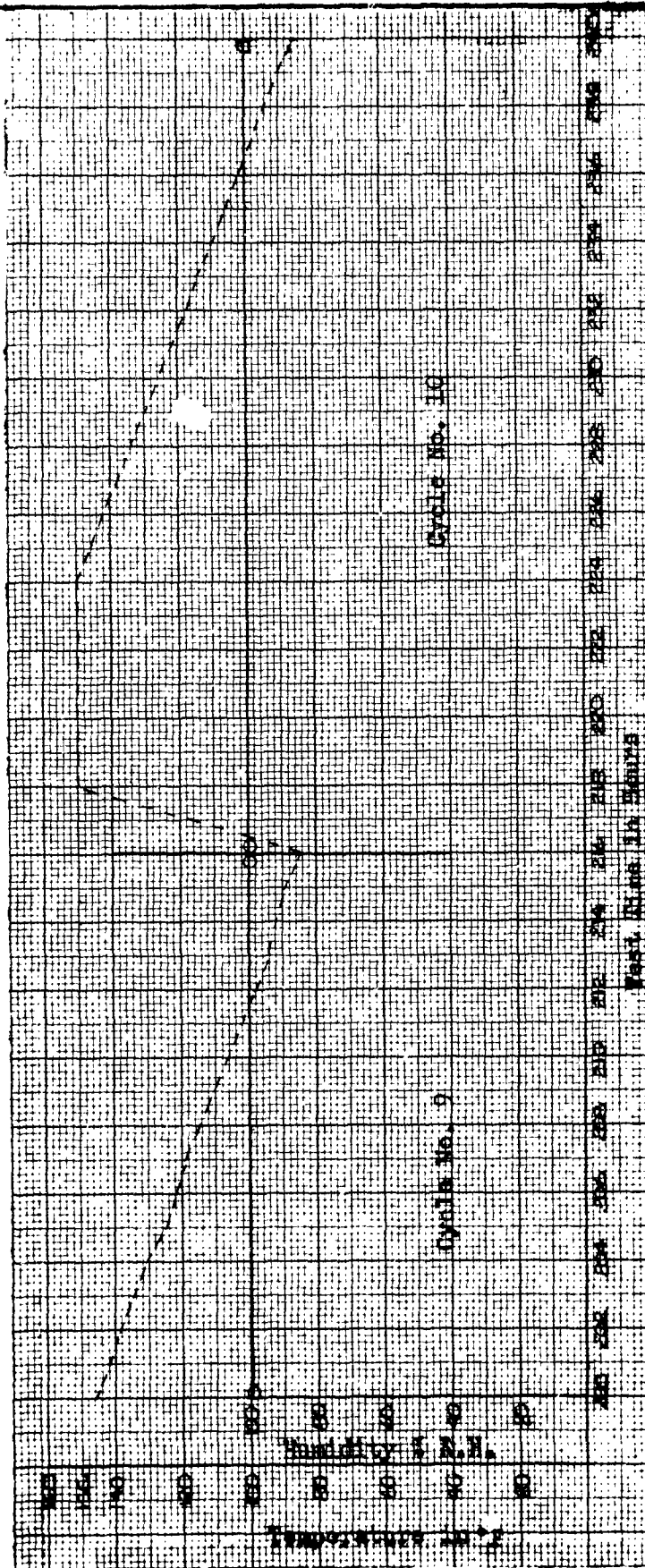
KEY: HUMIDITY ○—○  
TEMPERATURE ---

2-Stage-600 (Typical Cycle Assembly)  
HUMIDITY (PERCENTAGE)

FIGURE 6





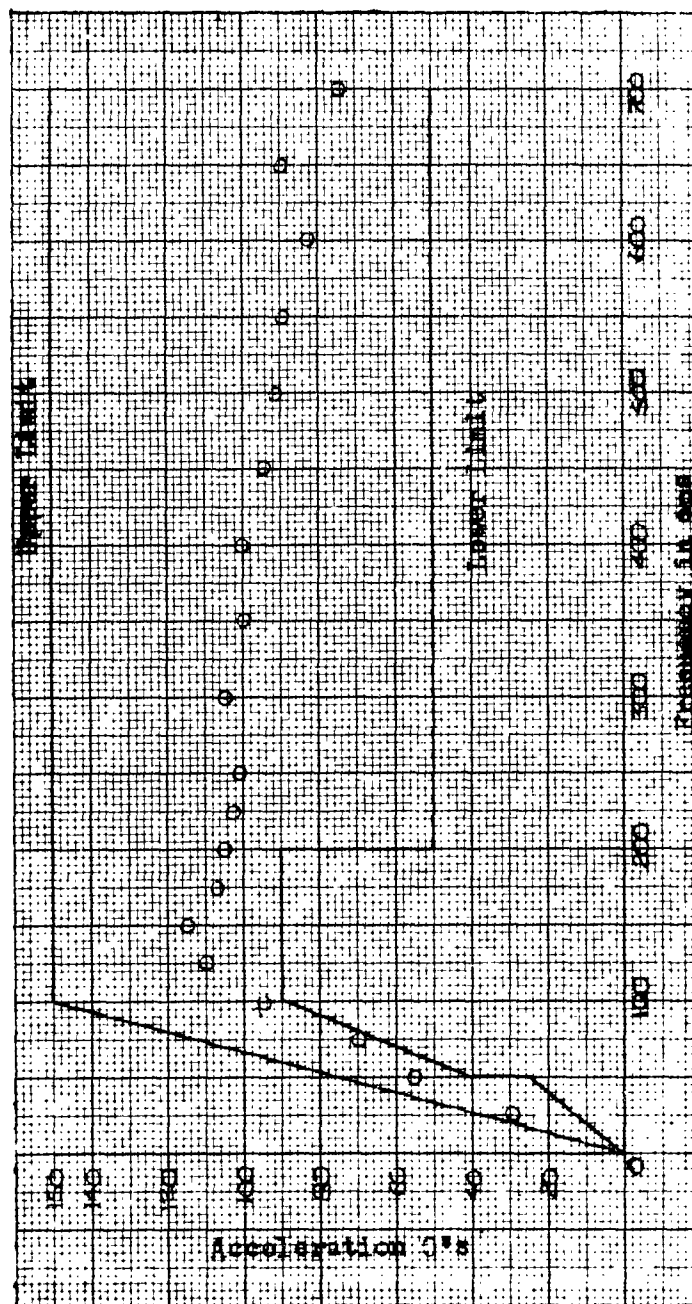


KEY: HUMIDITY —○—  
TEMPERATURE ---

21-2800-0102 (Typical Cycle Assembly)  
Humidity (Non-operation)

FIGURE 7





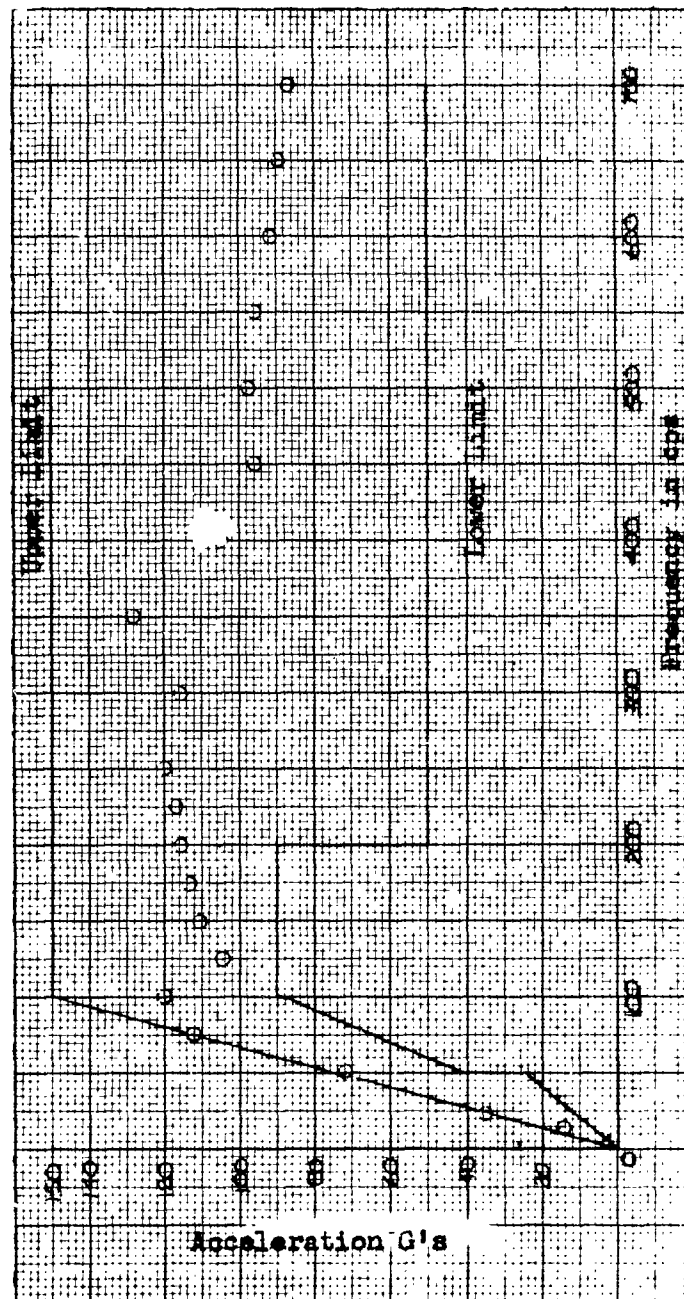
NET: ○ RESPONSE DATA POINT

21-51000-0602 (Typical Cable Assembly)  
 NON-OPERATING SHOCK SPECTRUM  
 TRANSVERSE AXIS DROP NO. 2

FIGURE 9



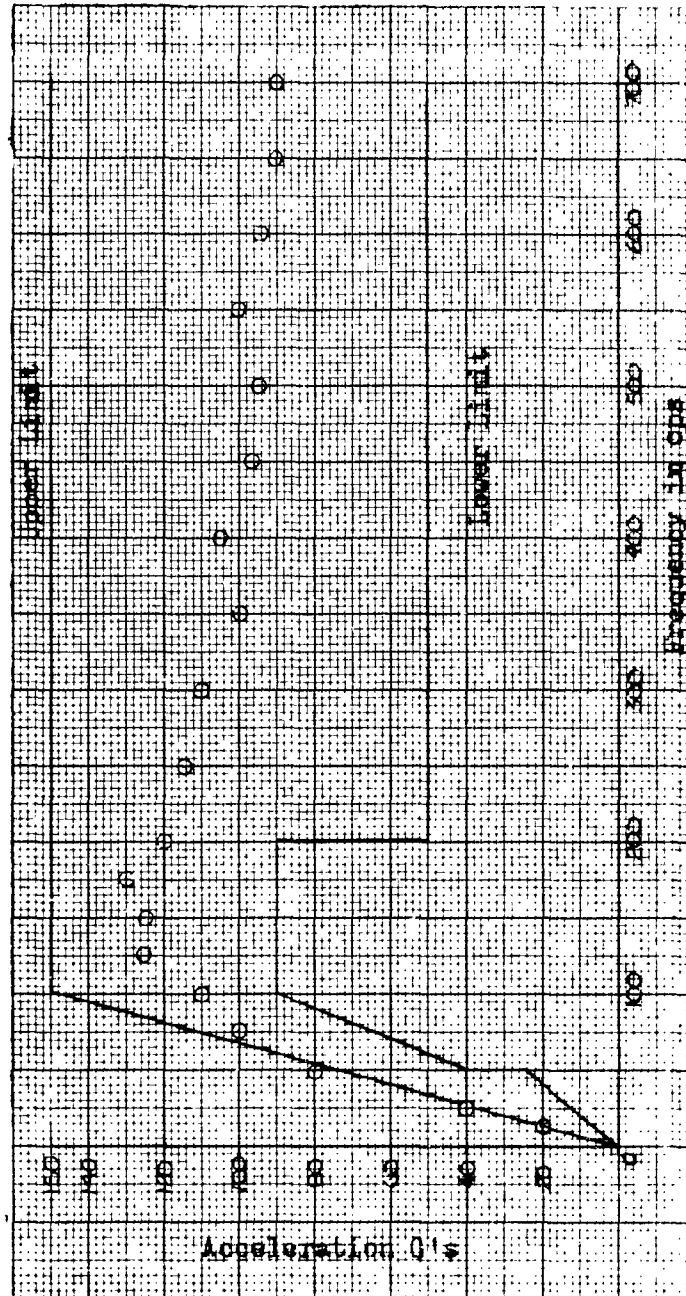




KEY: ○ RESPONSE DATA POINT

21-51000-0602 (Typical Cable Assembly)  
 NON-OPERATING SHOCK SPECTRUM  
 AXIAL AXIS DROP NO. 1

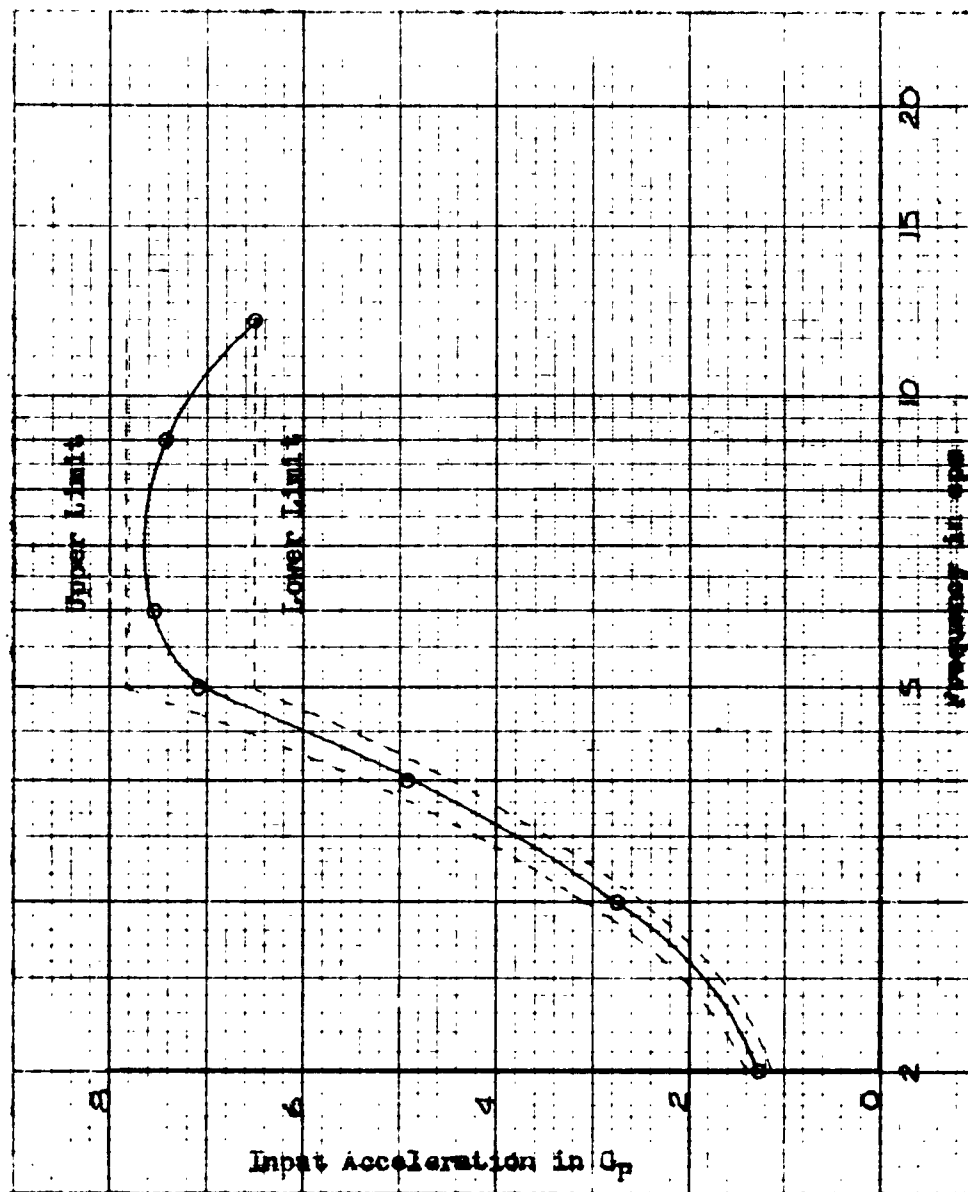
FIGURE 10



KEY: ○ RESPONSE DATA POINT

21-51000-0602 (Typical Cable Assembly)  
 NON-OPERATING SHOCK SPECTRUM  
 AXIAL AXIS DROP NO. 2

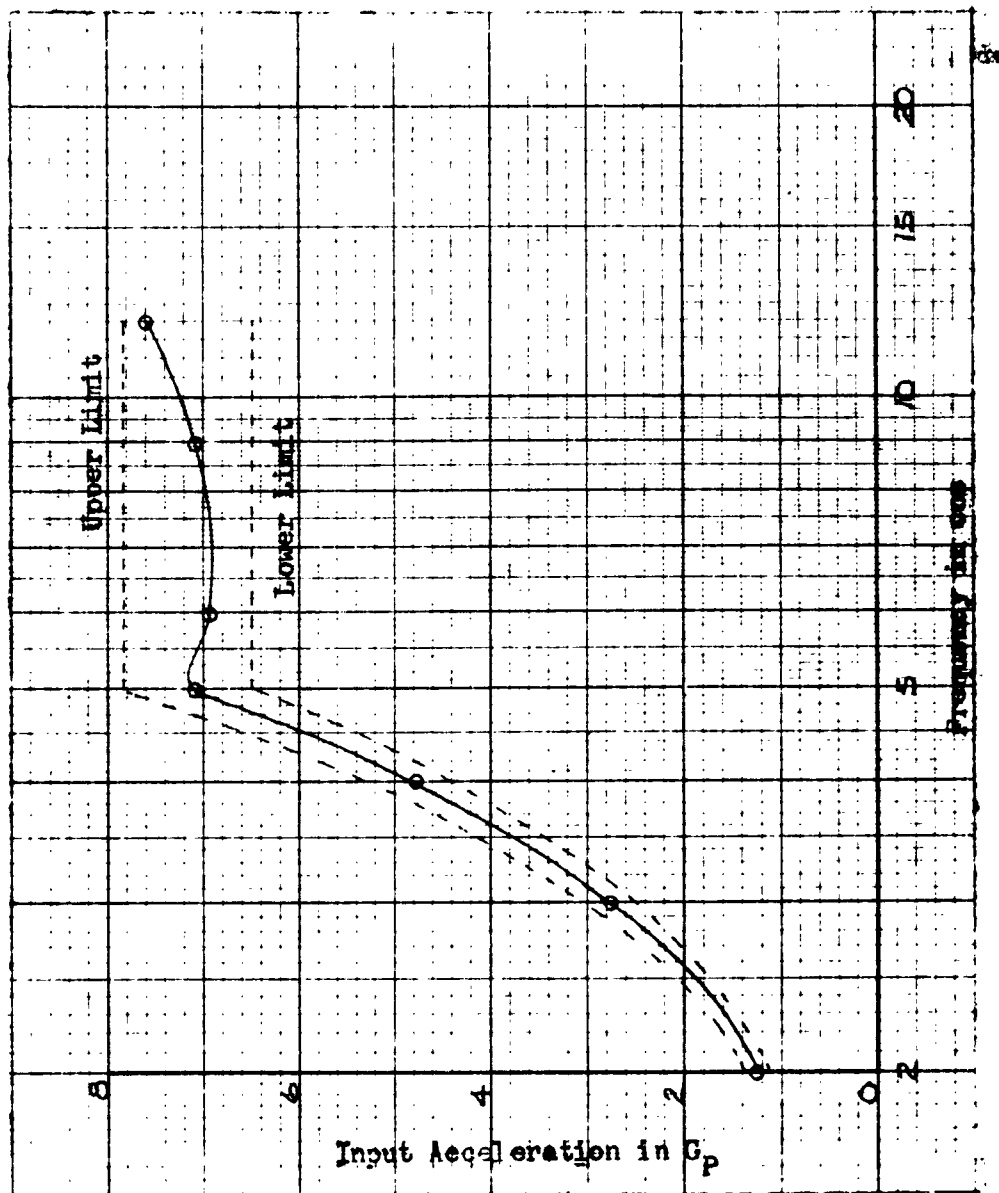
FIGURE 11



21-2000-0602 (Typical Rifle Assembly)  
 OPERATING VIBRATING  
 TYPICAL AXIAL AXIS SWEEP

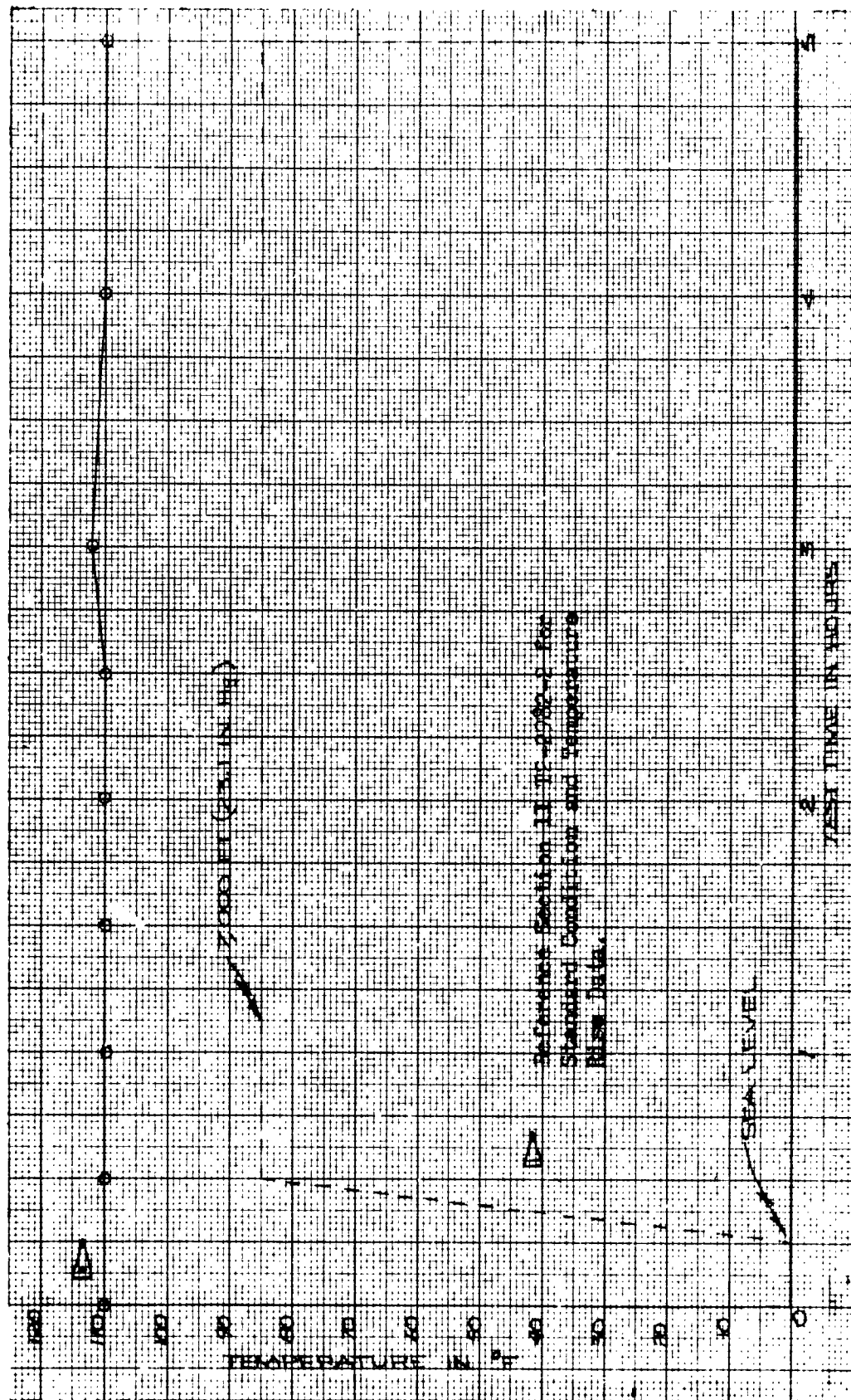
FIGURE 12





21-51000-0602 (Typical Cable Assembly)  
 OPERATING VIBRATION  
 TYPICAL TRANSVERSE AXIS SWEEP

FIGURE 13



21-21000-0602 (Typical Cable Assembly)  
Temperature-Altitude (Operating)

FIGURE 14



6. CONCLUSIONS AND RECOMMENDATIONS - The Cable Assemblies successfully passed all tests required by D2-6564-1 (See 7.3 herein concerning revision required to original requirements). There are no recommended design changes as the result of these tests.

## 7. NOTES

7.1 Data Package - The source of the Qualification test results and reduced test data herein is a volume of data, which contains Manufacturing and Inspection Records, data sheets, photographs, informal reports, etc. The data is packaged as Boeing Documents T2-2982-1 and -2. These documents are available from Boeing upon request (Reference 2.1).

### 7.2 Sequence of Tests

P/N 21-51663-2

- a. Shock
- b. Vibration (Operating)
- c. Humidity
- d. Temperature-Altitude (Non-Operating)
- e. Temperature-Altitude (Operating)

P/N 21-51666-1, S/N 0000004

- a. First Article Configuration Inspection (FACI)

7.3 Requirement Change - The test specimens did not pass the insulation resistance test within tolerance after exposure to the humidity test of Procedure I, Condition B of MIL-E-4970A. Authorization to delete the requirement for conducting the insulation resistance test following non-operating environmental tests was authorized by BSD Message Form BSQAP 4-2-11 dated February 4, 1963.

7.4 Operating Vibration - The Launch Control Facility cable assemblies for convenience and to expedite the test program were tested to the more severe Launch Facility operating vibration test ( $\pm 7.1G$  Limited to 6" D.A., 2-12-2 cps).

TEST SUMMARY							
REPORT PARAGRAPH	TEST CONDITION	PROCEDURE PARAGRAPH	SUPPLEMENT PARAGRAPH	TEST LIMITS	NUMBER OF SAMPLES		REMARKS
					TESTED	PASSED	
4.3.1	Temperature-Altitude (Non-Operating)	5.2	4.	-69°F to +150°F at 20,000 ft.	8	8	
4.3.2	Humidity (Non-Oper)	5.3	4.	+2% R.H. +70°F to 150°F for 240 hours.	8	8	See 7.3
4.3.3	Shock (Non-Operating)	5.4	4.	100G's at 100 cps	8	8	
4.3.4	Vibration (Operating)	5.5	4.	7.36 (peak) 2-13-2 cps	8	8	
4.3.5	Temperature-Altitude (Operating)	5.2.2	4.2	150°F at 10,000 ft.	8	8	

BOEING

20-4000-1

